

SmartVFD COMPACT

PRODUCT DATA



GENERAL

SmartVFD COMPACT variable frequency drives provide step less speed control for various applications:

- Pumps
- Fans
- Compressors
- Conveyors, etc.

FEATURES

- Compact size - saves space in your equipment cabinet
- Flexible side-by-side mounting with screws or DIN-rail as standard
- Single rating suitable for both pump and fan or machine applications
- Maximum ambient temperature: + 122 °F
- Integrated RFI-filters
- Wide input and output connection possibilities
- Configurable inputs and outputs
- 30 second Start-Up Wizard
- Easy “keypad to remote” change with 1 button
- Parameter upload/download even without main power to the drive with HVFDCABLE accessory
- Quiet motor operation with 4 kHz switching frequency

- Overtemperature ride-through
- Power ride-through
- Automatic restart
- Integrated PI controller
- Optional NEMA 1 enclosure

SPECIFICATIONS

Mains Connection

Input voltage U_{in} :

115Vac, -15%...+10% 1~
 208...240 Vac (-15...+10%), 1~
 208...240 Vac (-15...+10%), 3~
 380...480 Vac (-15...+10%), 3~
 600Vac (-15...+10%), 3~

Input frequency: 45...66 Hz

Connection to mains: Once per minute or less

Brake chopper:

Available on MI2 and MI3, with 3-phase units: 100% *TN with brake option; 30% *TN without brake option.

Motor Connection

Output voltage: 0 - U_{in} , 3~

Output current:

I_N : Continuous output current with max. +50 °C ambient temperature, overloadability 1.5 x I_N (1min/10min)

Starting current: 2 x I_N 2s/20s

Output frequency: 0...320 Hz

Frequency resolution: 0.01 Hz

Control Characteristics

Control method:

Frequency Control U/f Open Loop Sensorless Vector Control

Switching frequency: 1.5...16 kHz; default 6 kHz

Field weakening point: 30...320 Hz

Acceleration time: 0.1...3000 sec



Deceleration time: 0.1...3000 sec

Braking torque:

100% *TN with brake option (only in 3~ drives sizes MI2 and MI3)
30%*TN without brake option

Ambient Conditions

Operating temperature:

+ 14 °F (-10 °C) (no frost)...+ 104/122 °F
(40/50 °C) for 115 Vac, 460 Vac and 600 Vac and + 104 °F
(40 °C), for 208 Vac/230 Vac, rated loadability I_N

Storage temperature: -40 °F (-40 °C)...+158 °F (+70 °C)

Air quality:

Chemical vapors:

IEC 721-3-3, unit in operation, class 3C2

Mechanical particles:

IEC 721-3-3, unit in operation, class 3S2

Altitude:

100% load capacity (no derating) up to 1000 m
1% derating for each 100 m above 1000 m; max. 2000 m

Relative humidity:

0...95% RH, non-condensing, non-corrosive, no dripping water

Vibration: 3...150 Hz

EN50178, EN60068-2-6:

Displacement amplitude 1(peak) mm at 3...15.8 Hz
Max acceleration amplitude 1 g at 15.8...150 Hz

Shock

EN50178, IEC 68-2-27:

UPS Drop Test (for applicable UPS weights)

Storage and shipping: max 15 g, 11 ms (in package)

Enclosure class: Open chassis, NEMA 1 kit optional

Electro Magnetic Compatibility (EMC)

Immunity:

Complies with EN50082-1, -2, EN61800-3, Category C2

Emissions:

115V: Complies with EMC category C4

230V: Complies with EMC category C2; with an internal RFI filter

400V: Complies with EMC category C2; with an internal RFI filter

600V: Complies with EMC category C4

All: No EMC emission protection (Honeywell level N): Without RFI filter

Safety:

For safety: CB, CE, UL, cUL

For EMC: CE, CB, c-tick

(see unit nameplate for more detailed approvals)

Control connections

Analog input voltage:

0...+10V, $R_i = 200k\Omega$ (min), Resolution 10 bit, accuracy $\pm 1\%$, electrically isolated

Analog input current:

0(4)...20 mA, $R_i = 200\Omega$ differential resolution 0.1%, accuracy $\pm 1\%$, electrically isolated

Digital inputs: 6 positive logic; 0...+30 VDC

Voltage output for digital inputs:

+24V, $\pm 20\%$, max. load 50 mA

Output reference voltage:

+10V, +3%, max. load 10 mA

Analog output:

0(4)...20 mA; R_L max. 500Ω ; resolution 16 bit; accuracy $\pm 1\%$

Digital outputs:

Relays:

2 programmable relay outputs (1 NO/NC and 1 NO),
Max.switching load: 250 Vac/2 A or 250 Vdc/0.4 A

Open collector:

1 open collector output with max. load 48 V/50 mA

Protections

Overvoltage protection:

875VDC in HVFDCDXCXXXXXX

437VDC in HVFDCDXBXXXXXX

Undervoltage protection:

333VDC in HVFDCDXCXXXXXX

160VDC in HVFDCDXBXXXXXX

Earth-fault protection:

In case of earth fault in motor or motor cable, only the frequency converter is protected

Unit overtemperature protection: YES

Motor overload protection: YES

Motor stall protection (fan/pump blocked): YES

Motor underload protection

(pump dry / belt broken detection): YES

Short-circuit protection of +24V and +10V reference voltages: YES

Overcurrent protection: Trip limit $4.0 \cdot I_N$ instantaneously

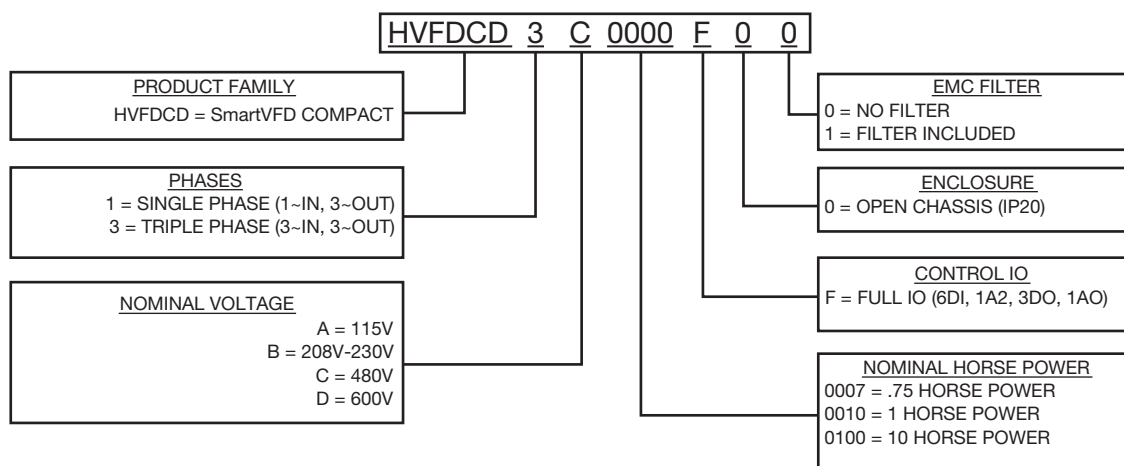
MODELS

Table 1.

Nominal Voltage	Nom. HP (Nom. Current)	EMC Filter	Full IO (6DI, 2AI, 1AO, 1DO, 3RO, Modbus)
Frame Size: MI1	Dimensions: 6.2" H x 2.6" W x 3.9" D		
460V 3~in 3~out	0.5 HP (1.3 A)	No	HVFD3C0005F00
		EMC	HVFD3C0005F01
	0.75 HP (1.9 A)	No	HVFD3C0007F00
		EMC	HVFD3C0007F01
	1 HP (2.4 A)	No	HVFD3C0010F00
		EMC	HVFD3C0010F01
208/230V 1~in 3~out	0.25 HP (1.7 A)	EMC	HVFD1B0003F01
	0.5 HP (2.4 A)	EMC	HVFD1B0005F01
	0.75 HP (2.8 A)	EMC	HVFD1B0007F01
208/230V 3~in 3~out	0.25 HP (1.7 A)	No	HVFD3B0003F00
	0.5 HP (2.4 A)	No	HVFD3B0005F00
Frame Size: MI2	Dimensions: 7.7" H x 3.5" W x 4.0" D		
460V 3~in 3~out	1.5 HP (3.3 A)	No	HVFD3C0015F00
		EMC	HVFD3C0015F01
	2 HP (4.3 A)	No	HVFD3C0020F00
		EMC	HVFD3C0020F01
	3 HP (5.6 A)	No	HVFD3C0030F00
		EMC	HVFD3C0030F01
208/230V 1~in 3~out	1 HP (3.7A)	EMC	HVFD1B0010F01
	1.5 HP (4.8 A)	EMC	HVFD1B0015F01
	2 HP (7 A)	EMC	HVFD1B0020F01
208/230V 3~in 3~out	1 HP (3.7A)	No	HVFD3B0010F00
	2 HP (7 A)	No	HVFD3B0020F00
115V/230V 1~in 3~out	0.25 HP (1.7 A)	No	HVFD1A0003F00
	0.5 HP (2.4 A)	No	HVFD1A0005F00
	1 HP (3.7A)	No	HVFD1A0010F00

Nominal Voltage	Nom. HP (Nom. Current)	EMC Filter	Full IO (6DI, 2AI, 1AO, 1DO, 3RO, Modbus)
Frame Size: MI3	Dimensions: 10.2" H x 3.9" W x 4.3" D		
460V 3~in 3~out	4 HP (7.6 A)	No	HVFD3C0040F00
		EMC	HVFD3C0040F01
	5 HP (9 A)	No	HVFD3C0050F00
		EMC	HVFD3C0050F01
	7.5 HP (12 A)	No	HVFD3C0075F00
		EMC	HVFD3C0075F01
208/230V 1~in 3~out	3 HP (1 A)	EMC	HVFD1B0030F01
208/230V 3~in 3~out	3 HP (11 A)	No	HVFD3B0030F00
115V/230V 1~in 3~out	1.5 HP (4.8 A)	No	HVFD1A0015F00
600V 3~in 3~out	1 HP (2 A)	No	HVFD3D0010F00
	2 HP (3.6 A)	No	HVFD3D0020F00
	3 HP (5 A)	No	HVFD3D0030F00
	5 HP (7.6 A)	No	HVFD3D0050F00
	7.5 HP (10.4 A)	No	HVFD3D0075F00

PRODUCT IDENTIFICATION CODE



M35443

Fig. 1. Product Identification Code.

MECHANICAL DIMENSIONS AND MOUNTING

There are two possible ways to mount the SmartDrive Compact onto the wall; either screw or DIN-rail mounting. The mounting dimensions are also given on the back of the inverter.

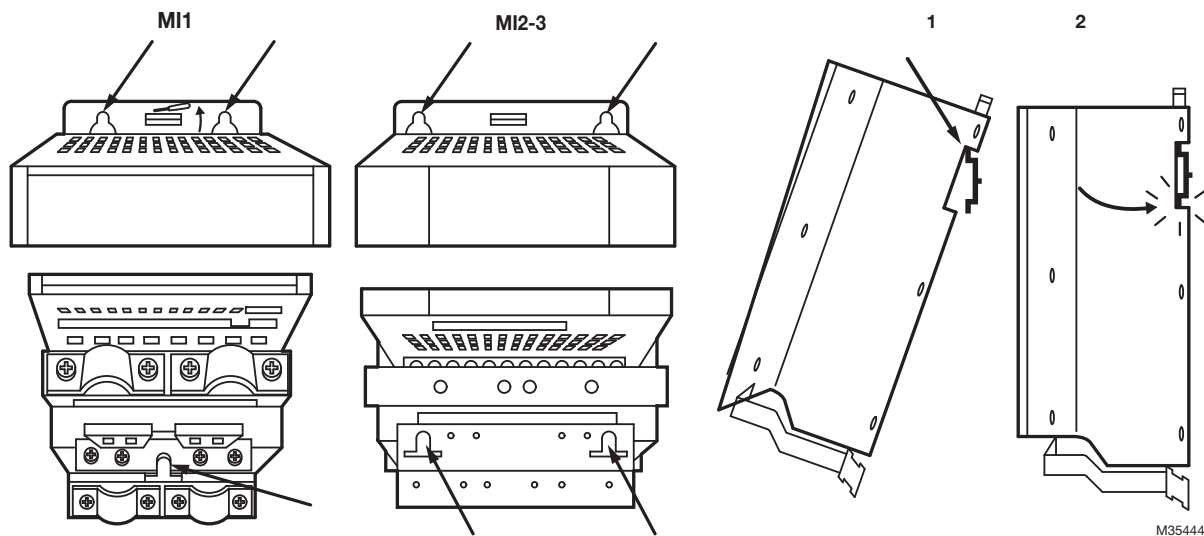
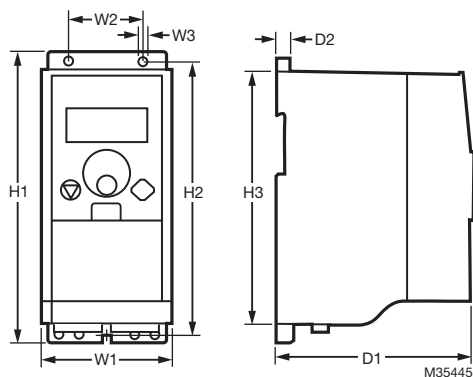


Fig. 2. Mounting with screws or DIN-rail.



Mechanical size	H1	H2	H3	W1	W2	W3	D1	D2
MI1	6.2	5.8	5.4	2.6	1.5	0.2	3.9	0.3
MI2	7.7	7.2	6.7	3.5	2.5	0.2	4.0	0.3
MI3	10.3	9.9	9.5	3.9	3.0	0.2	4.3	0.3

Fig. 3. Dimensions in inches.

COOLING

Forced air flow cooling is used in all SmartDrive Compact drives. Enough free space shall be left above and below the inverter to ensure sufficient air circulation and cooling. SmartDrive Compact products can be mounted side by side. You will find the required dimensions for free space and cooling air in the tables below:

Table 2.

Mechanical size	Free space above [inches]	Free space below [inches]
MI1	4.0	2.0
MI2	4.0	2.0
MI3	4.0	2.0

Table 3.

Mechanical size	Cooling air required [CFM]
MI1	5.89
MI2	5.89
MI3	17.7

CABLING AND FUSES

Use cables with heat resistance of at least +158 °F (+70 °C). The cables and the fuses must be dimensioned according to the following tables. The fuses function also as cable overload protection. These instructions apply only to cases with one motor and one cable connection from the inverter to the motor. In any other case, contact your Honeywell Sales Representative.

Table 4.

Connection	Cable type
Mains cable	Power cable intended for fixed installation and the specific mains voltage. Shielded cable not required. (NKCABLES/MCMK or similar recommended)
Motor cable	Power cable equipped with compact low-impedance shield and intended for the specific mains voltage. (NKCABLES /MCCMK, SAB/ÖZCUY-J or similar recommended). 360° grounding of both motor and FC connection required to meet the standards.
Control cable	Screened cable equipped with compact low-impedance shield (NKCABLES /Jamak, SAB/ÖZCuY-O or similar).

Table 5. Cable and fuse sizes for 208-240 V.

Size	Type (power)	I _N [A]	Fuse [A]	Mains cable Cu [AWG]	Terminals cable size (min/max)			
					Main terminal [AWG]	Earth terminal [AWG]	Control terminal [AWG]	Relay terminal [AWG]
MI1	P25 - P75	1,7 – 3,7	10	2 x 15 + 15	15 - 11	15 - 11	20 - 15	20 - 15
MI2	1P1 - 1P5	4,8 – 7,0	20	2 x 13 + 13	15 - 11	15 - 11	20 - 15	20 - 15
MI3	2P2	11	32	2 x 9 + 9	15 - 9	15 - 9	20 - 15	20 - 15

Table 6. Cable and fuse sizes for 380-480 V.

Size	Type (power)	I _N [A]	Fuse [A]	Mains cable Cu [AWG]	Terminals cable size (min/max)			
					Main terminal [AWG]	Earth terminal [AWG]	Control terminal [AWG]	Relay terminal [AWG]
MI1	P37 - 1P1	1,9 – 3,3	6	3 x 15 + 15	15 - 11	15 - 11	20 - 15	20 - 15
MI2	1P5 - 2P2	4,3 – 5,6	10	3 x 15 + 15	15 - 11	15 - 11	20 - 15	20 - 15
MI3	3P0 - 5P5	7,6 - 12	20	3 x 13 + 13	15 - 9	15 - 9	20 - 15	20 - 15

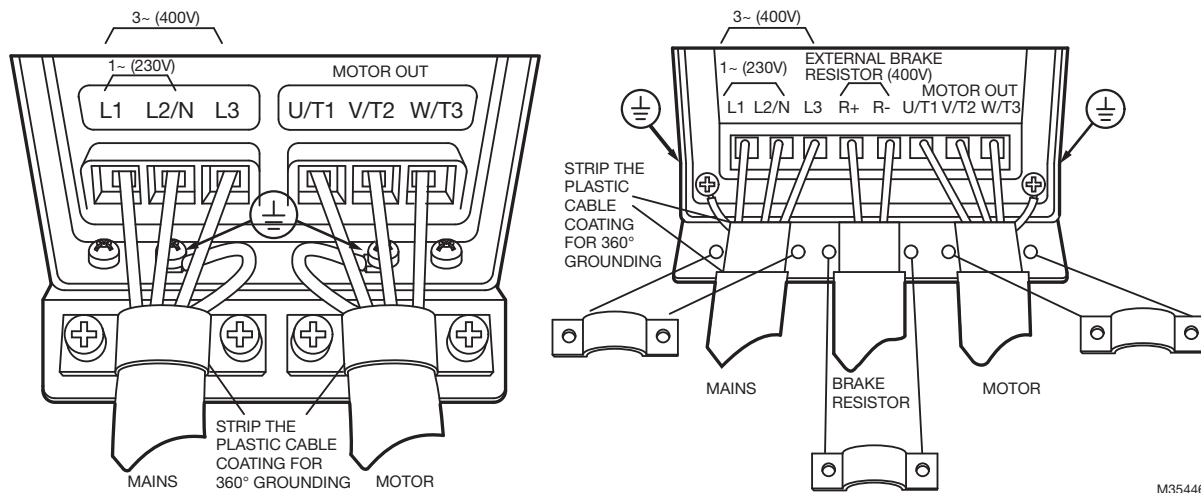


Fig. 4. SmartDrive Compact power connections.

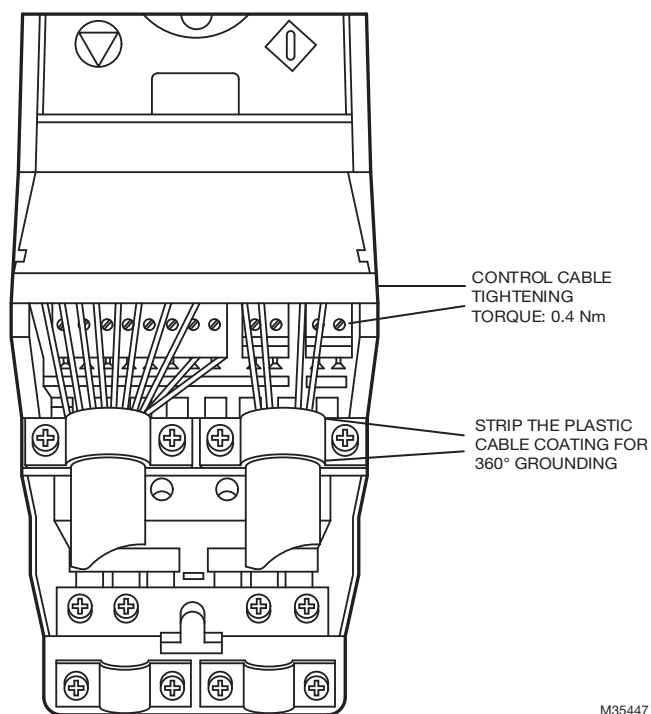


Fig. 5. SmartDrive Compact control connections wiring.

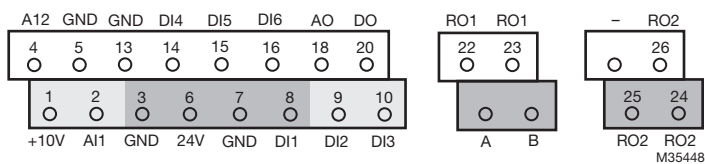
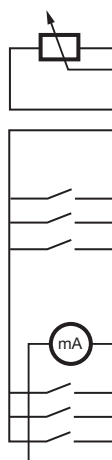


Fig. 6. SmartVFD Compact control connection terminals.

The table below shows the SmartDrive Compact control connections with the terminal numbers.

API FULL



TERMINAL	SIGNAL	FACTORY PRESET	DESCRIPTION
1	+10Vre	REF. VOLTAGE OUT	MAXIMUM LOAD 10 mA
2	AI1	ANALOG SIGNAL IN 1	FREQ. REFERENCE ^{P)} 0 – + 10 V Ri = 200 k Ω (MIN)
3	GND	I/O SIGNAL GROUND	
6	24Vout	24V OUTPUT FOR DI'S	±20% MAX LOAD 50 mA
7	GND	I/O SIGNAL GROUND	
8	DI1	DIGITAL INPUT 1	START FORWARD ^{P)} 0 – + 30 V Ri = 12 k Ω (MIN)
9	DI2	DIGITAL INPUT 2	START REVERSE ^{P)}
10	DI3	DIGITAL INPUT 3	PRESET SPEED B0 ^{P)}
A	A	RS485 SIGNAL A	FB COMMUNICATION
B	B	RS485 SIGNAL B	FB COMMUNICATION
4	AI2	ANALOG SIGNAL IN 2	PI ACTUAL VALUE ^{P)} 0(4) – 20 mA, Ri = 200 k Ω
5	GND	I/O SIGNAL GROUND	
13	GND	I/O SIGNAL GROUND	
14	DI4	DIGITAL INPUT 4	PRESET SPEED B1 ^{P)} 0 – + 30 V Ri = 12 k Ω (MIN)
15	DI5	DIGITAL INPUT 5	FAULT RESET ^{P)}
16	DI6	DIGITAL INPUT 6	DISABLE PI CONTR. ^{P)}
18	AO	OUTPUT FREQUENCY ^{P)}	0(4) – 20 mA, RL = 500 Ω
20	DO	DIGITAL SIGNAL OUT	ACTIVE = READY ^{P)} OPEN COLLECTOR, MAX. LOAD 48V/50mA
22	RO 11	RELAY OUT 1	ACTIVE = RUN ^{P)} MAX. SWITCHING LOAD: 250Vac/2A OR 250Vdc/0.4A
23	RO 12		
24	RO 21	RELAY OUT 2	ACTIVE = FAULT ^{P)} MAX. SWITCHING LOAD: 250Vac/2A OR 250Vdc/0.4A
25	RO 22		
26	RO 23		

^{P)} = PROGRAMMABLE FUNCTION, SEE USER MANUAL, PARAMETERS

M35449

Fig. 7. Control inputs and outputs – API Full.

FEATURES / FUNCTIONS

Easy to set-up features

Table 7.

Feature	Functions	Benefit
30 second Start-up wizard	Simple 4 step wizard for specific applications Activate wizard by pressing stop for 5 seconds Tune the motor nominal speed Tune the motor nominal current Select mode (0=basic, 1= Fan, 2 = Pump and 3 = Conveyor)	Fully configured inverter for the application in question Ready to accept 0-10V analog speed signal in just 30 seconds
“Keypad – Remote” Operation	Push the navigation wheel for 5 seconds to move from remote control (I/O or Fieldbus) to manual mode and back.	Single button operation to change the control to manual (keypad) and back. Useful function when commissioning and testing applications
Quick Setup Menu	Only the most commonly used parameters are visible in basic view to provide easier navigation. The full view can be seen after P13.1 Parameter conceal is deactivated by changing the value to 0.	Easy navigation through the most common parameters
SmartVFD Commissioning Tool	<ol style="list-style-type: none"> Parameter sets can be uploaded and downloaded with this tool. Easy to use PC-tool for commissioning the SmartVFD Inverters. Connection with HVFDCABLE and MCA adapter, (HVFD-CDMCAKIT/U), to the USB port of the PC. PC-tools available for download free of charge from https://customer.honeywell.com/en-US/support/commercial/software/vfds/Pages/default.aspx 	Parameter copying easily from 1 inverter to another. Easy download of parameter sets created with PC-tool Parameterizing with PC Saving settings to PC Comparing parameter settings

Compact and robust design with easy installation

Table 8.

Feature	Functions	Benefit
Compact size	Minimum free space above and below the drive is required for cooling airflow.	Minimum space requirements
Integrated RFI-filters	The units comply with EN61800-3 category C2 as standard. This level is the required level for public electricity networks such as buildings.	Easy selection and installation of products. Space savings Cost savings
Single power rating	Single power suitable for both pump and fan or machine applications	Easy selection
Max. ambient temperature + 122 °F	High maximum ambient operating temperature	Uninterruptible operation
Side by side mounting with screws or DIN-rail as standard	SmartDrive Compact can be mounted side by side with no space between the units either with screws or on DIN-rail as standard. Dimensions for screw mounting can be found also on the back of the inverter.	Easy installation Space savings

Uninterruptible operation functions

Table 9.

Feature	Functions	Benefit
Overtemperature ride-through	Automatically adjusts switching frequency to adapt to unusual increase in ambient	Uninterruptible operation
Power ride-through	Automatically lowers motor speed to adapt to sudden voltage drop such as power loss	Uninterruptible operation
Auto restart function	Auto restart function can be configured to make VFD restart automatically once fault is addressed	Uninterruptible operation

VFD and motor control features

Table 10.

Feature	Functions	Benefit
Flying start	Ability to get an already spinning fan under speed control	Improved performance Ease of application
Inbuilt PI- controller	Capability to make a standalone system with sensor connected directly to the inverter for complete PI- control.	Cost saving

OPTIONAL ACCESSORIES

Table 11. SmartVFD COMPACT Accessories.

Model Number	Description
HVFDCALE/U	SmartVFD Commissioning Cable and USB Adaptor
HVFDCEMCA/U	Compact Commissioning Device
HVFDCEMCAKIT/U	Compact Commissioning Kit
HVFDCEMCA1FR1/U	Compact NEMA 1 Kit Frame Size1
HVFDCEMCA1FR2/U	Compact NEMA 1 Kit Frame Size2
HVFDCEMCA1FR3/U	Compact NEMA 1 Kit Frame Size3
HVFDCEMCA1FR3/U	Compact Training Demonstration Kit

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31-00075—01 M.S. 01-15
Printed in United States

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